Import Competition, Foreign Inputs, and Labor Adjustment in a Developing Country: Evidence from Colombian Liberalization

Juan Muñoz-Morales
IÉSEG School of Management
j.munoz@ieseg.fr

Leonardo Bonilla
Banco de la República
lbonilme@banrep.gov.co

Abstract

We study how import competition and foreign inputs coming from high-income countries affect employment and earnings in less-developed economies. We use administrative data from Colombia, and exploit exogenous tariff reductions that increased Colombian imports from the United States, to derive four conclusions that contrast with previous findings for high-income economies. First, import competition decreases employment in a similar magnitude that foreign inputs increase it. Second, losses in manufacturing employment are driven by substitution with foreign inputs. Third, labor market adjustment among informal workers occurs by decreased earnings rather than employment. Fourth, high-skilled workers experience significant earnings losses, whereas low-skilled do not, and the effect is focused towards the informal, high-skilled jobs. Our results show that international trade between countries with different levels of economic development does not create only winners in developing countries, but, instead, has highly heterogeneous responses that contrast with those found within developed economies.

Introduction

The effects of imports from low-income countries on the labor markets of high-income economies have been widely studied. However, the effects of imports from high-income countries on the labor markets of low-income countries remain completely understudied. Both types of effects are not the same due to differences in the degree of substitutability of local workers by imported products, which depends on the level of development of the local economy. This substitution can occur directly by a competition effect that drives firms out of the market or by an intermediate input effect that complements/substitutes local workers by foreign intermediate inputs. Both type of effects differ when analyzing labor markets in high- and low-income economies.

In this paper, we use an exogenous decrease in Colombian tariffs that increased imports from the United States, leaving Colombian exports unchanged. We leverage cross-industry variation in the intensity of the tariff decrease to estimate a differences-in-differences model that identifies the causal effect of import competition and foreign inputs on Colombian labor market. We use highly detailed data on Colombian imports and labor market outcomes to estimate the model.

Research Question

How does the penetration of goods from high-income countries affect the labor market in low-income economies?

Conceptual Framework

Let us assume a representative firm in industry j that combines labor and foreign inputs to produce, and has substitution between both factors of production (i.e. assuming CES technology). If we derive the labor demand, and assume a change in tariffs (charged as an ad-valorem tariff to the foreign input) we find that employment can be affected by competition or by substitution with foreign inputs. Formally, this implies that:

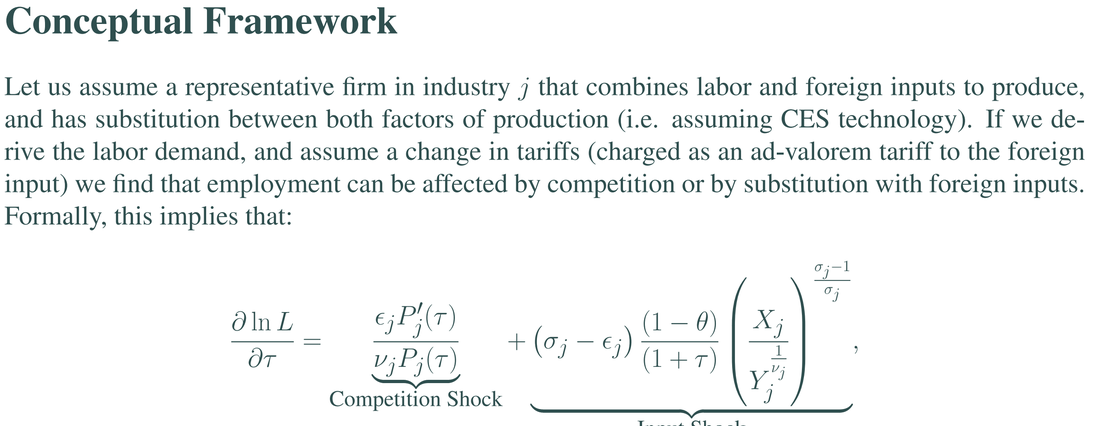
$$\frac{\partial \ln L}{\partial \tau} = \underbrace{\frac{\epsilon_j P_j'(\tau)}{\nu_j P_j(\tau)}}_{\text{Competition Shock}} \underbrace{+ \left(\sigma_j - \epsilon_j\right) \frac{(1-\theta)}{(1+\tau)} \left(\frac{X_j}{Y_j^{\frac{1}{\nu_j}}} \right)^{\frac{\sigma_j - 1}{\sigma_j}}}_{\text{Input Shock}},$$

where P_j is the output price, X_j is the amount of foreign input, Y_j is the total production, ϵ_j is the price elasticity of demand, v_j denotes the degree of homogeneity of the production function, and σ_j is the elasticity of substitution between labor and foreign inputs.

Background

The United States is Colombia's biggest trade partner, representing around 40% of Colombian trade. In 2010, Colombia unilaterally and unexpectedly decreased tariffs for intermediate inputs coming from everywhere in the world. Later, in 2012, Colombia implemented a difficult-to-predict free-trade agreement with the United States that brought the tariffs charged to U.S. products to zero. Both tariff reductions increased exclusively imports from the United States and left Colombian exports unaffected.

Figure 1: Tariff Reductions



Empirical Strategy

We estimate the following model at the industry, j, and year, t, level:

$$y_{jt} = \beta^c \tilde{\tau}_{jt} + \beta^i \tilde{q}_{jt} + \mu_j + \mu_t + u_{jt}, \tag{1}$$

where y_jt is either employment or earnings (industry wage-premia), μ_j and μ_t correspond to industry and year fixed effects, $\tilde{\tau}_{jt}$ corresponds to the import competition shock, and $\tilde{q}_{jt}$ to the foreign input shock. The shocks are formally defined as:

$$\tilde{\tau}_{jt} = \tau_{j,2010} - \tau_{jt},$$
$$\tilde{q}_{jt} = \sum_k w_{jk}^{2008} \tilde{\tau}_{kt}.$$

The competition shock is the change in tariffs with respect to the year before the liberalization (2010), and input shock is a weighted average of the decrease in tariffs across inputs k for outcome j.The weights w_{jk} are computed using imports per firm in 2008 and, as a robustness, a Colombian input-output matrix.

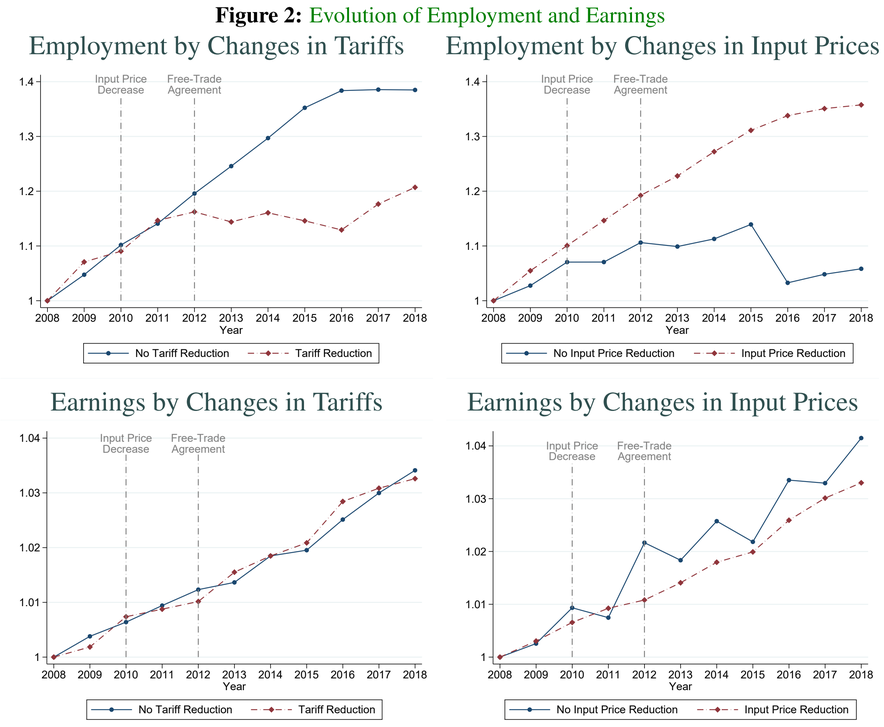
We compute a weighted sum of both effects to evaluate if both shocks are different from each other. The sum is weighted by the average change in each shock to made both of them comparable:

$$\text{Weighted Sum}_j = \underbrace{\Delta\bar{\tau}_j \times \beta_j^c}_{\text{Competition Shock}} + \underbrace{\Delta\bar{q}_j \times \beta_j^i}_{\text{Input Shock}}.$$

Results

Our analysis yields four main results. However, we first present some evidence in levels to show the nonexistence of pre-trends:

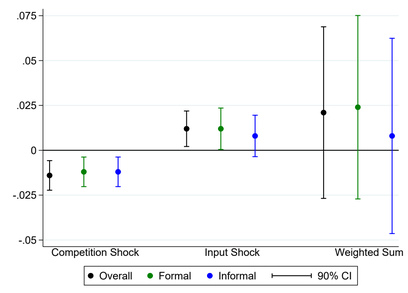
Figure 2: Evolution of Employment and Earnings



We also present event-study estimates in the paper that show formally the non-existence of pre-trends. For the sake of presentation we exclude those figures from this poster.

Result 1. ***Import competition and foreign inputs have opposite effects off employment of similar magnitude.***

Figure 3: Effects of Import Competition and Foreign Inputs on Employment



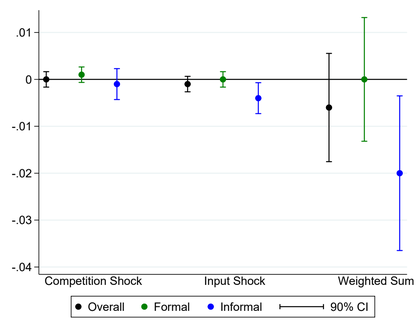
We observe that import competition decreases formal and informal employment with an elasticity of around -1.4. The input shock has an opposite effect with an elasticity of around 1.2. When we sum both shock, weighting them by the magnitude of the shock, we cannot reject the null that both effects are different from zero.

We then move to estimate the effect on earnings, which constitutes the second result.

Result 2. ***The input shock decreases earnings of informal workers***

When estimating the result in earnings we observe that the input shock decreases earnings of informal workers, exclusively. We define informal workers as those that do not contribute to health or pensions. This type of workers are not bounded by minimum wages nor constrained by formal contracts. Therefore, they are more likely to adjust via-earnings than by employment. This is exactly what our second result suggests.

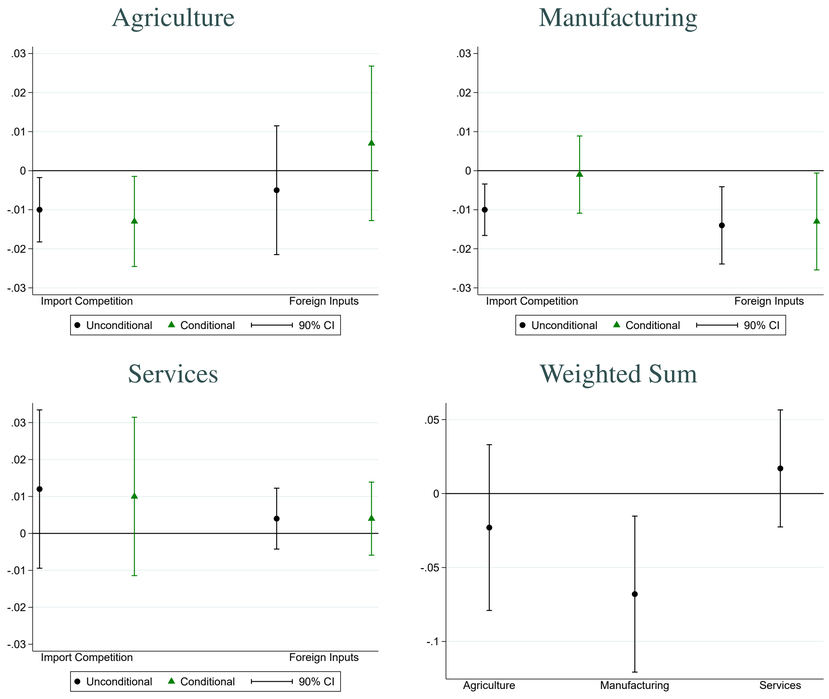
Figure 4: Effects of Import Competition and Foreign Inputs on Earnings



We then explore the heterogeneity of these effects, which give light about the mechanisms behind this adjustment effects. We first start by analyzing the differential effect by types of industries. Such heterogeneity motivates our third result.

Result 3. ***Manufacturing employment decreases mainly by substitution with foreign inputs, rather than by competition.***

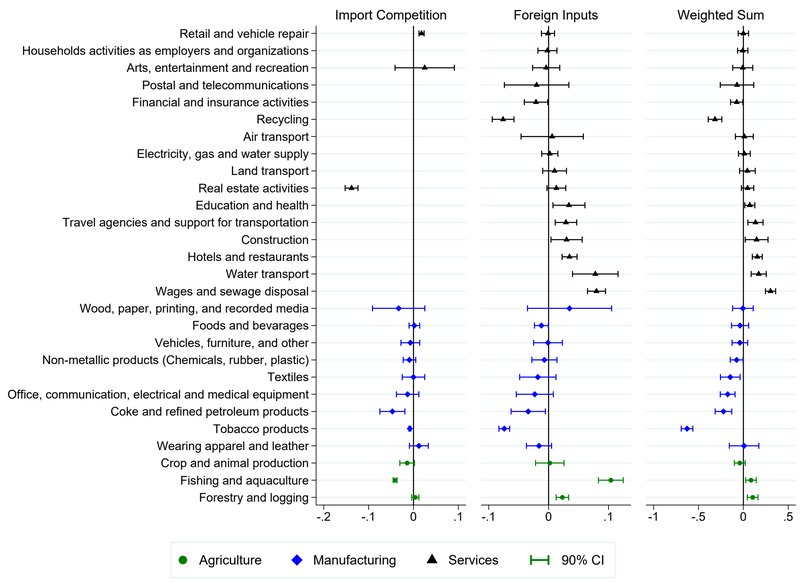
Figure 5: Effects of Competition and Input Shocks by Economic Sector



The black point estimates correspond each shock estimated separately, whereas the green point estimates correspond to both shocks estimated jointly. We observe that the competition shock, conditional on the input shock, decreases employment in agriculture exclusively. The input shock, on contrary, decreases manufacturing employment conditioning and not on the competition shock. Such result implies that foreign inputs substitute for labor in the manufacturing sector.

The input shock, additionally, increases employment in the services sector. To look at this we estimate the results interacting with two-digit industry code dummies:

Figure 6: Effects of Competition and Input Shocks by Two-Digit Sector

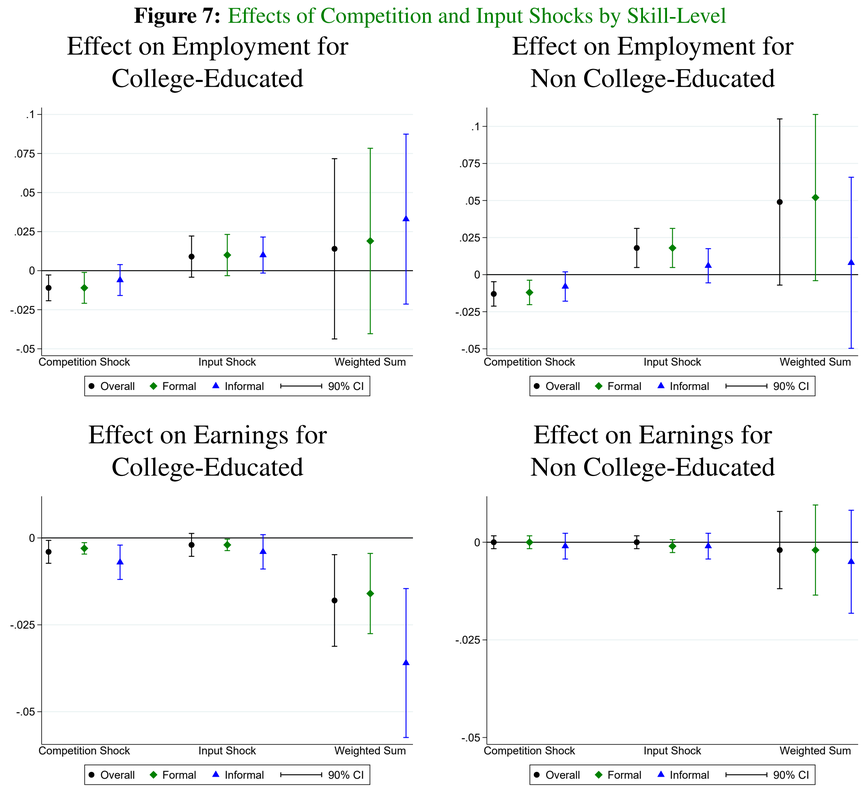


We see again a decrease of employment in manufacturing industries, but a positive effect in some services sector that are quite important for Colombia.

Result 4. ***College-educated workers seem to be more affected, especially the informal.***

We now estimate the model by workers who are and not college-educated. We find striking evidence that the decrease of earnings for the informal workers, Result 2 , is driven by the college-educated informal workers. We additionally find that the opposing effects for the competition and input shocks occur for both types of workers: college and non-college educated.

Figure 7: Effects of Competition and Input Shocks by Skill-Level



Conclusions

Products from the United States have the following effects:

- Import competition and foreign Inputs have opposite effects on employment.
- Input shock decreases earnings of informal workers.
- Input shock decreases employment in manufacturing.
- Informal, college-educated workers decrease earnings.

⇒ Trade between countries with different level of development has heterogeneous responses in developing countries that contrast with developed economies.